


Stress management strategy of Education Scientists with high blood pressure

A case for multivariate analysis and implications for school management system

Ngozi Anyaegbunam, PhD^a, Queen E. Igabari, PhD^b, Elizabeth Osita Egbule, PhD^b, Ifeanyichukwu B. Agbigwe, MEd^c, Kelechi R. Ede, PhD^d, Uzoamaka Patricia Agu, PhD^e, Felicia Ngozi Ezeaku, PhD^{e,*}, Ifesinachi Jude Ezugwu, PhD^f, Desmon Ngwainmbi, PhD^a, Sebastine Ebunmerek Andor, PhD^a, Jazuli Tijjani, PhD^g, Beth Nnenne Oluka, PhD^h, Innocent Ebere Okereke, PhD^a, Ifeanyichukwu D. Okoro, PhDⁱ, Ogochukwu Vivian Nwabunani, MEd^j, Joy Obiageli Oneli, BEd^{j,k} 

Abstract

Background: When under stress, the body secretes a large amount of hormones. These hormones cause the heart to beat more quickly and the blood vessels to constrict, leading to a temporary increase in blood pressure. The release of stress hormones and an accelerated heartbeat are 2 ways that improper stress reactions can raise blood pressure and increase the risk of a heart attack. Keeping this in mind, the current study aimed to investigate the effectiveness of the rational emotive behavior therapy (REBT) approach in reducing stress among Education Scientists with high blood pressure in higher institutions of learning in southeastern Nigeria.

Methods: The study utilized a simple randomized controlled trial design, which included a pretest, posttest, and follow-up test. The study population consisted of 78 participants who were randomly assigned to either the treatment or control group, with 39 participants in each group. The treatment involved following a modified REBT manual.

Results: The findings of the study indicated that REBT was successful in reducing the stress levels of academic staff who underwent the treatment. This effect was sustained during the follow-up test.

Conclusion: Stress was found to be a result of irrational thoughts and erroneous beliefs. However, through the implementation of REBT principles and strategies, individuals were able to address their negative thought patterns, which were characterized by inflexibility, rigidity, and extremism. Further research is needed to confirm the impact of REBT on reducing depression, anxiety, and mental exhaustion in populations from institutions outside the southeastern region of Nigeria.

Abbreviations: PSS = perceived stress scale, REBT = rational emotive behavior therapy, TIBS = teacher irrational belief scale.

Keywords: Education Scientists, high blood pressure, REBT, school management system, stress management strategy

1. Introduction

Given the growing literature on stress among different populations there is still an increase in the rate of its prevalence.

Education Scientists are among the population that experiences high levels of stress. Thus, heavy workload, research pressure, administrative tasks, conducting and recording of

Participants completed a written informed consent form to show their willingness to participate in the study. The authors give consent for publication.

The authors have no funding and conflicts of interest to disclose.

The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

Department of Science Education, University of Nigeria approved the study through the local ethics committee.

^a Department of Science Education, University of Nigeria, Nsukka, Nigeria,

^b Department of Guidance and Counselling, Delta State University, Abraka, Delta State,

Nigeria, ^c Department of Special Needs Education, University of Nigeria, Nsukka,

Nigeria, ^d Department of Agricultural Education, University of Nigeria, Nsukka, Nigeria,

^e Department of Educational Foundation, University of Nigeria, Nsukka, Nigeria,

^f Department of Educational Studies in Psychology, Research Methodology and

Counselling, University of Alabama, Tuscaloosa, AL, ^g Department of Educational

Psychology, Sa'adatu Rimi College of Education, Kumbotso, Kano State, Nigeria,

^h Department of Special Education, Ebonyi State University, Abakaliki, Ebonyi State,

Nigeria, ⁱ Department of Social Science Education, University of Nigeria, Nsukka,

Nigeria, ^j Teleo Network International School of Theology, Pastoral Ministry Grace Training International Bible Institute, Duluth, Gambia, ^k Department of Counselling and Human Development Studies, University of Nigeria, Nsukka, Nigeria.

* Correspondence: Felicia Ngozi Ezeaku, Department of Educational Foundation, University of Nigeria, Nsukka, Nigeria (e-mail: felicia.ezeaku@unn.edu.ng).

Copyright © 2024 the Author(s). Published by Wolters Kluwer Health, Inc. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial License 4.0 (CCBY-NC), where it is permissible to download, share, remix, transform, and buildup the work provided it is properly cited. The work cannot be used commercially without permission from the journal.

How to cite this article: Anyaegbunam N, Igabari QE, Egbule EO, Agbigwe IB, Ede KR, Agu UP, Ezeaku FN, Ezugwu IJ, Ngwainmbi D, Andor SE, Tijjani J, Oluka BN, Okereke IE, Okoro ID, Nwabunani OV, Oneli JO. Stress management strategy of Education Scientists with high blood pressure: A case for multivariate analysis and implications for school management system. *Medicine* 2024;103:52(e41046).

Received: 10 September 2024 / Received in final form: 29 November 2024 /

Accepted: 4 December 2024

<http://dx.doi.org/10.1097/MD.0000000000041046>

Key points

- This study specifically examined REBT intervention for stress among Education Scientists with high blood pressure, a group that has been less extensively studied compared to other high-stress professions like healthcare workers and other counterparts.
- The study offered insights into a tailored school management system that considers the unique work environment and stressors of Education Scientists, providing evidence for customized interventions that address their specific needs.
- The study added to existing research by demonstrating the effectiveness of specific stress reduction interventions, such as mindfulness, exercise, or other relaxation techniques, in lowering blood pressure among Education Scientists.
- The findings provided concrete evidence of improvements in both psychological well-being outcome for this population.

examinations, tight deadlines, funding challenges, adapting to evolving educational technology, inability to cope with teaching, conducting laboratory experiments, and other research aside from teaching have been remarked as factors imposing uncontrollable stress to the tertiary institutions' biological science lecturers.^[1-3] Other factors reported by scholars are not limited to the uncondusive working environment, conditions attached to service, and lack of laboratory apparatus and reagents for practical classes.^[4-6]

Researchers have identified stress based on work-related tasks like dealing with characteristics behavior of students, excessive workload, lack of control over tasks, interpersonal and intrapersonal conflict, inadequate support from the management and colleagues, and stress based on the workplace role like, lack of necessary resources for effective teaching and conducting practical's oriented exercise, overloaded responsibilities and lack of recognition as 2 types of stress that ultimately affects teacher's performance and wellbeing.^[6,7] Besides, the stress could be associated with poor work output, mental disorganization, poor interpersonal relationships, decrease in the commitment of the employee and organization among others.^[3,8,9]

Past studies have remarked that stress is not only posing threats to proper and effective commitments to duties and concern in relation to quality service delivery but predisposes individuals including lecturers teaching biology in the institutions of higher learning to aggressive behavior, psychological quagmire, depressive symptoms, anxiety, truants and negligence to duties.^[1,10] A related study posits that stress derails both psychological and physical energy; induces accidents, and poor job ratings.^[11] However, neglecting the level of stress experienced by biological lecturers would create a significant negative impact, for example, the quality of research and practical-orientated exercise will be affected, students learning and motivation will dwindle, job dissatisfaction will be experienced and quality service delivery will as well be affected.

However, previous studies have reported the prevalence rate of lecturers' psychiatric problems induced by stress across the globe. Researchers have reported higher levels of stress among educators when compared with other professions.^[12-14] The Association of University Teachers documented that over 60% of academic and related staff found their job stressful and 50% reported psychological distress.^[1,15] In a study conducted in Canada, 13% of psychological distress and 22% of elevated physical health symptoms were reported.^[16] High level of stress was equally reported in a study conducted in the United

Kingdom.^[17,18] In a previous cross-sectional study conducted by Balakrishnan et al^[19] 78.4% high-stress level prevalence was reported among preservice teachers. In Nigeria, the story is the same. Available evidence documented 62% prevalence.^[20] Nwimo and Onwunaka^[21] reported higher level of stress among the teaching staff. However, teaching staff output and efficiency would reduce, the capacity and motivation to perform will decrease, and mental morbidity and rigidity of thought could increase if the cause and effect of stress are neglected and ignored.

Stress can be experienced by any individual irrespective of male or female gender. Gender is a sociological construct that means different things to different people. World Health Organization^[22] defines gender as socially constructed characteristics of women and men such as norms, roles, and relationships of and between groups of men and women. United Nations Educational Scientific and Cultural Organization^[23] refers to gender as the roles and responsibilities of men and women that are created in families, societies, and our cultures. Okeke^[24] explains that gender is socially or culturally constructed characteristics, qualities, behaviors, and roles that different societies ascribe to females and males. Unlike biological sex, gender includes expectations, roles, and characteristics of a member of a society that are made evident in the approved process of socialization dictated by society. In operational terms, gender could be perceived as a socially constructed set of roles and responsibilities associated with being male or female. In this study, gender could be referred to as both male and female lecturers teaching science subjects in the higher institutions of learning.

From the literature reviewed, gender could influence how individuals experience stress in their places of work. Agbigwe^[25] indicated that female teachers experience significantly higher levels of occupational stress specifically regarding interaction with students and colleagues, workload, and students' progress. Also, Miller^[26] posits that since differences exist between males and females in physical characteristics, the influence of gender on the stress of workers may not be the same. But Lonkilla^[27] argued that there is no gender difference in the stress of workers academic staff not excluded. This controversy calls for additional research.

Stress can induce hypertension by both inducing frequent increases in blood pressure and stimulating the neurological system to generate high levels of vasoconstricting chemicals. A number of factors, such as white coat hypertension, job strain, race, social milieu, and mental discomfort, can influence blood pressure through stress.^[28] Additionally, the impact on blood pressure increases when one risk factor is combined with additional stress-inducing factors. All things considered, research indicates that while stress does not directly cause hypertension, it can influence its course. It has been discovered that a range of non-pharmacologic stress management techniques effectively lower blood pressure and prevent the onset of hypertension.^[28]

The stress experienced by teaching staff including biological lectures could be tackled using adaptable evidence-based therapy like rational emotive behavior therapy. Rational emotive behavior therapy is a psychological technique for decreasing the high stress level affecting their well-being and job performance to enable them to function optimally.^[29,30] Rational emotive behavior therapy by Albert Ellis helps individuals recognize those events and situations that could induce faulty psycho-emotional distress and provide the clients with an alternative and more balanced thoughtful pattern.^[31-33] The authors, therefore, remarked that the process that induced stress especially that of academic staff includes stressful situations and existing events within the environment.^[32] Thus, researchers have argued that irrational beliefs individual holds regarding situations within their environment could predispose such individuals to undue-stress.^[34,35]

In other words, misinterpretations of any given situation would automatically affect not only the psycho-emotional dispositions of the clients but their motivational spirit, zeal, job output as well as their health status.

Consequently, the beliefs individual staff hold regarding their job and environment could also induce stress.^[34,36] Their belief is irrational once it is inflexible, illogical, inappropriate, and maladaptive in this case, the achievement of the desired occupational goal and both mental and physical healthiness will be affected.^[37] But on the other hand if the belief is anchored on empirical reality, the positive goal will be achieved, healthiness is maintained and progress will as well be documented.^[38–40]

More so, past research findings have documented that erroneous interpretations of a situation have deleterious functional consequences and it is not limited to maladaptive behavior, distorted emotions, impaired emotions, emotional distress, anxiety, pressure, depression, and anger.^[3,38,41–43] Thus, Kyriacou and Sutcliffe^[44] posit that teachers' perception of their enormous work-related tasks and their lack of ability to complete these tasks can inversely impact their mental and/or physical health their work environment, their colleagues, and their students. Similar studies also remarked that teaching staff could be vulnerable to irrational thoughts when they think that they lack the capacity to handle any given situation that concerns themselves, their job, and the environment.^[32,38] Therefore, being tenacious to irrational belief could predispose individuals to experience stressful situations including symptoms like depression, loss of appetite, high blood pressure, and ulcers when compared to those with rational beliefs.^[45–49] The focal point to irrational beliefs commonly held by individuals including those in teaching professions are demandingness, self-downing beliefs, low frustration tolerance beliefs, and awfulizing beliefs.^[50] Given this, rational emotive behavior therapy (REBT) encourages the development of preferences, unconditional self-acceptance, unconditional other-acceptance, unconditional life-acceptance, high frustration tolerance as well as anti-awfulizing beliefs as more realistic thoughts.^[51–54] Thus, individuals like teaching staff experiencing stress-related symptoms could negatively interpret their experiences in very rigid, unhelpful, and self-defeating ways once their thought is neglected and ignored.^[55,56] Thus, they could be vulnerable to maladaptive related behaviors and worthless feelings.^[57–59]

Empirical-based findings have remarked that well application of REBT techniques and its underlying principles is effective in decreasing the cause and effect of stress symptoms.^[32,55,60,61] Similar studies posit that the objective of REBT program is to teach the clients to be more optimistic and more rational to overcome any irrational and erroneous emotions that could trigger stress-related symptoms.^[62,63] However, the American Addiction Center^[64] postulates that REBT interventions target clients' belief systems, attitudes, and thought processes as the mechanisms of change because they play significant roles in how REBT applies its clinical effects. Hence, a successful REBT practice assists individuals exhibit a positive change in attitude, and thinking and improves self-limiting belief.

Thus, understanding the effectiveness of REBT in treating stress-related symptoms among educational scientists with high blood pressure is a crucial issue. Hence, the rationale of this study is posed in a question form thus, what is the effect of the rational emotive behavior approach in decreasing stress among biological science lecturers at the tertiary institutions in southeastern Nigeria, and if REBT is effective to what extent? We, therefore, hypothesized that a rational emotive behavior approach will be effective in decreasing the stress among Education Scientists with high blood pressure in the federal higher institutions in southeastern Nigeria. The result of this study will provide knowledge about quality improvement that would lead to understanding and identification of the principle

for the betterment of individuals to function effectively and live a quality work-life.

2. Methods

2.1. Study design

This study adopted a simple randomized, controlled trial design, including a pretest, posttest, and follow-up test. The randomization design is a study used for evaluating the effect of an intervention program, aimed to promote individual wellbeing.^[65] By this design, individuals are assigned into intervention and control groups and the result is evaluated after the intervention.^[65,66]

2.2. Ethical approval and participants

Research and Ethics Committee of the lead author's university affiliation approved the study with Ethical Clearance Code: UNN/EC/STA/010FE-RCHDS/101. Informed consent was obtained from each participant. We equally subscribed to the American Psychological Association^[66] ethical standards for conducting research with human subjects. The participants were informed about the purpose of the study, and their right to refuse and withdraw from the study once the program seizes from being captivating. All methods were performed in accordance with the relevant guidelines and regulations of the American Psychological Association.

The 78 Education Scientists who met the study criteria were recruited through WhatsApp platforms, short message service, phone calls, and email addresses. The study criteria include (i) being an academic staff with special training in biology, chemistry, physics, mathematics, or related areas, (ii) must have been scored at least 50 on the dependent measures and being identified as having stress, (iii), must sign a commitment letter indicating readiness to participate in the programme, and (iv) must be identified as having blood pressures. Those that did not meet the stated criteria were dropped. The sample power was determined using GPower 3.1 software^[67] the finding indicated that participants were adequate. See the demographic variable of the respondents in Table 1.

2.3. The therapist

Three female professors and a male with PhD who are experts in counseling psychology and had practiced psychological therapy for over a decade handled and delivered the treatment package designed for this study. The REBT manual was given to them a month before the commencement of the treatment program and they were requested to study the manual and make possible suggestions and corrections. Their corrections and inputs added value to the manual.

2.4. Treatment

The current study adapted a treatment manual developed by Muñoz et al.^[68] The manual of course was modified to suit the existing nomenclature within the study selected areas. In this study, the treatment aimed at inculcating the REBT principles, skills, techniques, and methods into the minds of the Education Scientists to enable them to alter such irrational thought and erroneous beliefs that could predispose them to stress (ii), help them develop a positive mindset to overcome any thought and belief not anchored on reality and been rigid, inflexible and extremist to situations (iii) help the clients develop a more functional state of mind, taking action to resolve their issues, recognizing and practicing new cognitive, behavioral, and emotional skills to achieve balance, and becoming self-aware, focused, and motivation, The manual was designed to run through 12 weeks

Table 1
Characteristics of the respondents.

Variables	Categories	Treatment	Control	Chi-square tests
Sex	Male	20 (51.3%)	20 (51.3%)	1.000
	Female	19 (48.7%)	19 (48.7%)	
Age	From 24 to 33 years	27 (69.2%)	23 (59.0%)	.345
	34–43 and above	12 (30.8%)	16 (41.0%)	
Experience	4–14 years	7.7%	23.1%	.143
	15–25	61.5%	56.4%	
	26–36 years and above	30.8%	20.5%	
Marital status	Married	71.8%	59.0%	.234
	Unmarried	28.2%	41.0%	
Qualification	B.Sc. Ed	17.9%	12.8%	.801
	M.Ed.	38.5%	38.5%	
	Ph.D.	43.6%	48.7%	
Employment status	Full time	74.4%	74.4%	1.000
	Part time	25.6%	25.6%	
Institutions	Universities	46.2%	35.9%	.357
	Colleges of education	53.8%	64.1%	
Field	Biological sciences	28.2%	25.6%	.778
	Biology education	33.3%	41.0%	
	Measurement and evaluation	38.5%	33.3%	

and 12 sessions. The treatment was a weekly session and each session lasted for 1 hour all culminating in 12 hours. However, the researchers equally conducted a 2-week follow-up assessment after 3 months. The treatment technique employed is not limited to, group discussions, mood relaxation, feedback, role-playing, case study, mindfulness practice, cognitive restructuring, and disputation exercise following a similar procedure employed by previous researchers.^[29,35]

2.5. Integrity check

The researchers employed 6 research assistants. Their jobs were to supervise and monitor the therapeutic program as it unfolded. This includes participants' responses and participation, response to take-home assignments, monitor whether the therapists are following the procedures as it appears in the intervention manual designed for this study. Also, they were requested to document their observations through writing. The reason is to ensure adequacy in all ramifications as it concerns treatment delivery.

2.6. Measures

2.6.1. Teacher irrational belief scale. Teacher irrational belief scale (TIBS) is a 30-item scale developed by Bernard.^[69] The objective of the instrument is to measure teacher's irrational beliefs in relation to their responsibilities and tasks as a teacher. Thus, the focus of TIBS are demandingness, low frustration tolerance, awfulizing and global evaluation. The instrument is rated on a 5-point Likert scale of Strongly Disagree; Disagree; Not sure; Agree; and Strongly Agree. In this study, the rating options were rearranged as follows (Strongly Disagree = 5 points), (Disagree = 4); (Not Sure = 3), (Agree = 2), and (Strongly Agree = 1). Hence, the high scores indicate the severity of irrational beliefs. The reliability test of this study showed an internal consistency of 0.82 alpha which indicates that the

instrument is valid and reliable. The validity of TIBS has been justified across the globe including Nigeria. The reliability α 0.76 of TIBS was reported in a study conducted among school employees. Bora et al^[70] reported an overall reliability index of 0.74. In Spain, Bermejo-Toro and Prieto-Ursua^[71] reported the validity of TIBS; Ugwoke et al^[56] also, validated the reliability of TIBS among technical college teachers in Southeast Nigeria.

2.6.2. Perceived stress scale. Cohen et al^[72] developed a perceived stress scale (PSS). PSS is aimed at measuring the extent to which individuals respond to stressful situations based on thoughts and feelings in the home and working environment. PSS is a 10-item, scale rated on a 5 points Likert scale of Never = 0, Almost Never = 1, Sometimes = 2, Fairly Often = 3 and Very Often = 4. Thus, the high score is rated as the high-stress level of the individual.^[73] The reliability test of this study showed an internal consistency of 0.86 alpha, indicating that the instrument is both valid and reliable. Related studies have validated the consistency and reliability of PSS items. A study conducted among the science and social science education facilitators in open and distance learning reported a reliability of 0.81 Cronbach alpha. In an assessment of stress management, 84 internal consistency reliability alpha was reported.^[29]

We surveyed the federal universities in the SE region of Nigeria to advertise the program. To each institution visited, we employed 2 research assistants who helped us post information to various campus notice boards and distribute flyers related to this study. Thus, 78 out of 89 Education Scientists that declared interest were selected based on meeting the study criteria (see Fig. 1). A pretest (time 1) was conducted on the participants to determine the eligibility and baseline data before the REBT treatment was given. The eligible participants were randomized to treatment and control groups. The study adopted a simple random allocation sequence by using random allocation software developed by Saghaei.^[74] The participants were assigned to treatment group and control groups. All the processes required before the commencement of the treatment program lasted between March to May, 2022. During the recruitment exercise, the researchers took adequate care to ensure that they eliminated selection bias during participants' recruitment and randomization by concealing the assignment and/or allocation sequence from the study participants and research assistants. We equally reduced the risk of potential bias by blinding the data analyst until the analysis was completed by concealing some details in the questionnaires, which may unveil the group that received the actual intervention. The therapeutic program took place at Full Orbit Resort, Trans Ekulu Enugu from September through December 2022. After the treatment program, a posttest (Time 2) was administered to all the participants in the REBT and control group. Similarly, 2 two-week follow-ups were equally conducted after 3 months, leading to the third assessment (Time 3). The follow-up test was conducted among the treatment group only to determine the retention level. At each assessment, the questionnaires were distributed and retrieved with the assistance of the research assistants on the spot from the participants to ensure that none was missing. At the end of every therapeutic session, the participants were given practice exercises beginning from session 2 which were often reviewed before the commencement of the next session program.

Below is the breakdown of the sessions and topics addressed during the implementation of the REBT program:

Session 1 = General introductions, the establishment of guiding rules and regulations, and the objective of the program.

Session 2 = Meaning and concept of stress and its concomitant effect on individual round growth and healthiness.

Sessions 3 and 4 engage the clients in the identification of their work-related irrational beliefs and perceived stressors.

Sessions 5 and 6 = Development of irrational thought, emotional and behavioral consequences of irrational thought while teaching.

Sessions 7 and 8 = Teaching how to create a new world view, how to cope with the realities of life (accepting losses and limits, bringing about a compromise between the demands of the unconscious and the requirements of reality).

Sessions 9, 10, and 11 = focus on engaging in active discussion and practices on how to dispute irrational thoughts and unhealthy beliefs, and replacing those irrational thoughts and beliefs with rational ones (REBT lessons and practice).

Session 12 = Termination. However, the participants in the control group received conventional counseling for 12 sessions that equally lasted for 1 hour at each meeting like their counterparts in the treatment group. We recorded zero dropouts among the participants.

In addition to the effectiveness of REBA, there exist some factors that helped in actualizing the current study objectives. For instance, the high level of human discipline displayed by the participants during the treatment time like showing active participation in both take-home assignments and asking questions as reported by our research assistants in their integrity check record is a reliable remark of study strength. The instruments used in both pretest, posttest, and follow-up tests were not only widely and universally validated but accepted. Also, we considered combining 2 instruments to assess the participants since past studies have shown that summated scales can offer accurate benchmarks for the interpretation of treatment outcomes, as well as for

determining and arriving at consistent conclusions regarding changes in Irrational beliefs as a psychological construct.^[32,75] In the same vain, some studies on stress management among the teaching staff, did not report the interaction effect of stress on gender, lacked integrity check records, failed to report the level of commitment of the participants and the therapist during intervention sessions, the proper identification of the therapist was not reported.^[35,56] All the aforementioned points were addressed in the current study, hence, the contribution to the knowledge gap.

2.7. Data analysis

The data from the study were subjected to statistical analysis using SPSS version 28. Specifically, the multivariate method of data analysis ascertained the effect of rational emotive behavior approach in decreasing the stress among Education Scientists with high blood pressure in the federal higher institutions in southeastern Nigeria. The effect size of the intervention was reported using Partial Eta square.

3. Results

The result in Table 2 indicated that the teaching staff levels of stress of both treatment and intervention group at pretest levels Time 1. The result showed that Biology teachers in REBT group did not differ at baseline from those in waitlisted control group in TIBS scores, $F(1, 77) = 3.212, P = .077, \eta_p^2 = .42$. At the posttest,

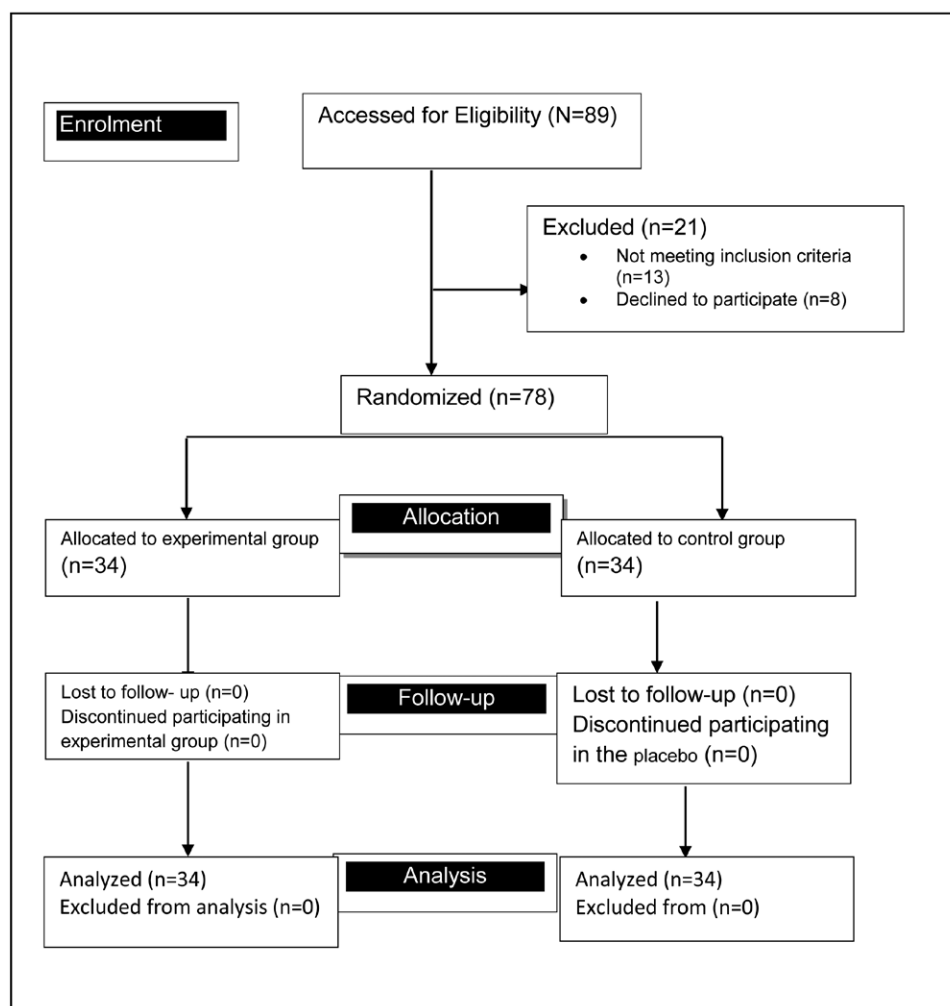


Figure 1. Participants allocation diagram.

Table 2**Tests of between-subjects effects of the intervention on teachers' irrational belief.**

Source	Dependent variable	Type III sum of squares	Df	Mean square	F	Sig.	Partial eta squared
Corrected model	TIBSPRETEST	176.479*	3	58.826	1.301	.281	.051
	TIBSPOSTEST	9550.498†	3	3183.499	63.824	.000	.724
	TIBSfollowup	9372.612‡	3	3124.204	66.093	.000	.731
Intercept	TIBSPRETEST	909,714.167	1	909,714.167	20,119.090	.000	.996
	TIBSPOSTEST	768,454.085	1	768,454.085	15,406.251	.000	.995
	TIBSfollowup	728,917.388	1	728,917.388	15,420.337	.000	.995
Group	TIBSPRETEST	145.255	1	145.255	3.212	.077	.042
	TIBSPOSTEST	9538.635	1	9538.635	191.234	.000	.724
	TIBSfollowup	9366.766	1	9366.766	198.155	.000	.731
Gender	TIBSPRETEST	2.138	1	2.138	.047	.828	.001
	TIBSPOSTEST	3.872	1	3.872	.078	.781	.001
	TIBSfollowup	.049	1	.049	.001	.974	.000
Group * gender	TIBSPRETEST	35.080	1	35.080	.776	.381	.011
	TIBSPOSTEST	52.390	1	52.390	1.050	.309	.014
	TIBSfollowup	3.827	1	3.827	.081	.777	.001
Error	TIBSPRETEST	3300.802	73	45.216			
	TIBSPOSTEST	3641.194	73	49.879			
	TIBSfollowup	3450.701	73	47.270			
Total	TIBSPRETEST	914,365.484	77				
	TIBSPOSTEST	780,580.576	77				
	TIBSfollowup	740,948.654	77				
Corrected total	TIBSPRETEST	3477.281	76				
	TIBSPOSTEST	13,191.692	76				
	TIBSfollowup	12,823.313	76				

* R squared = .051 (adjusted R squared = .012).

† R squared = .724 (adjusted R squared = .713).

‡ R squared = .731 (adjusted R squared = .720).

Education Scientists in the intervention group statistically and clinically significantly changed TIBS, $F(1, 77) = 191.234$, $P < .01$, $\eta^2_p = .724$. This was significantly improved at the follow-up test, $F(1, 77) = 198.155$, $P < .01$, $\eta^2_p = .731$. Biology teachers' scores were influenced significantly by group and gender interaction effect, $F(1, 50) = 1.050$, $P = .309$, $\eta^2_p = .014$.

The result in Table 3 indicated that the teaching staff levels of stress of both treatment and intervention groups at pretest levels Time 1. The result showed that Education Scientists in the REBT group did not differ at baseline from those in the waitlisted control group in lecturers' stress scores, $F(1, 77) = 4.989$, $P = .029$, $\eta^2_p = .063$. At the posttest, Education Scientists in the intervention group statistically and clinically significantly reduced stress, $F(1, 77) = 61.065$, $P < .001$, $\eta^2_p = .452$. The perception of the lecturers about work stress was significantly reduced at the follow-up test, $F(1, 77) = 421.769$, $P < .001$, $\eta^2_p = .0421.769$. Education Scientists' stress scores were influenced significantly by group and gender interaction effect, $F(1, 77) = .089$, $P = .767$, $\eta^2_p = .001$.

4. Discussion

The focus of the current study is to help Education Scientists with high pressure develop a positive mindset to overcome any thought and belief not anchored on reality. The outcomes have added value to the empirical realities of REBT in treating stress-related symptoms. Our result showed that participants exposed to REBT treatment benefited significantly from the intervention. Thus, the erroneous belief of the Education Scientists with high pressure which was identified as the major cause of their problem was not only dealt with but helped in decreasing the high level of stress identified at pretest. Noteworthy is that the reduction was maintained at the follow-up assessment. However, the result is very remarkable as it indicates that REBT strategies are effective in treating psychological-related problems including stress symptoms.

The findings of this study were in agreement with the results of the previous studies that validated the efficacy of REBT as the

best approach to treating stress-related problems.^[31,54,60] Similar studies reported improvement in stress reduction among teachers due to REBT intervention.^[76] Thus, the focus of the therapy is to help the clients alter their thinking patterns especially thoughts not anchored on reality. Hence, any alteration to irrational thoughts and erroneous beliefs will certainly lead to a decrease in any psycho-emotional disturbance induced by stress symptoms.^[31,77,78]

Consequently, the findings of the current study prove the indispensable nature of REBT in helping the individual to identify their irrational thought and erroneous beliefs and assist them via the application of different strategies to cope, remain independent of their thought and action, cope with stressful situations that could negatively influence their well-being in their place of work and maintain healthy living.^[61,79] So, we align our findings with that of prior research that reported the need to assist individuals especially the teachers build up rational emotive thoughts and beliefs and using REBT coping strategies to help them do better and cope with stressful situations in their places of engagement. Also, the implementation of REBT for biology lecturers in Nigerian universities who experience psychological problems like stress perfectly impacted not only work-related beliefs and stress levels but to individual wellness.

In relation to gender and stress, the findings of this study indicated that the stress of male and female Education Scientists exposed to treatment was reduced at posttest and the reduction was maintained at the follow-up test when compared to their counterpart in the control group. The finding of this study is in agreement with the past research findings that reported higher mean stress scores among the male gender.^[21,25,80,81] In a study conducted among the teachers teaching pupils with special needs, the result indicated that female teachers recorded lower stress compared to their male counterpart. Our findings contradict some studies that reported more stress among females than males.^[82] However, the current study is in agreement with Miller^[26] who argued that since men and women do not have the same physical characteristics, the influence of gender on the stress of workers may not be the same. The difference in stress

Table 3**Tests of between-subjects effects of the intervention on lecturers' stress.**

Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.	Partial eta squared
Corrected model	PretestPSS	39.767*	3	13.256	2.120	.105	.079
	PosttestPSS	788.810†	3	262.937	21.928	.000	.471
	FollowuptestPSS	2332.061‡	3	777.354	141.651	.000	.852
Intercept	PretestPSS	72,524.466	1	72,524.466	11,599.195	.000	.994
	PosttestPSS	54,631.416	1	54,631.416	4556.110	.000	.984
	FollowuptestPSS	52,562.103	1	52,562.103	9577.959	.000	.992
Group	PretestPSS	31.196	1	31.196	4.989	.029	.063
	PosttestPSS	732.222	1	732.222	61.065	.000	.452
	FollowuptestPSS	2314.592	1	2314.592	421.769	.000	.851
Gender	PretestPSS	10.196	1	10.196	1.631	.206	.022
	PosttestPSS	35.095	1	35.095	2.927	.091	.038
	FollowuptestPSS	6.602	1	6.602	1.203	.276	.016
Group * gender	PretestPSS	.029	1	.029	.005	.946	.000
	PosttestPSS	1.064	1	1.064	.089	.767	.001
	FollowuptestPSS	8.624	1	8.624	1.572	.214	.021
Error	PretestPSS	462.688	74	6.253			
	PosttestPSS	887.319	74	11.991			
	FollowuptestPSS	406.099	74	5.488			
Total	PretestPSS	73,306.160	78				
	PosttestPSS	56,584.210	78				
	FollowuptestPSS	55,512.970	78				
Corrected total	PretestPSS	502.455	77				
	PosttestPSS	1676.130	77				
	FollowuptestPSS	2738.160	77				

* R squared = .079 (adjusted R squared = .042).

† R squared = .471 (adjusted R squared = .449).

‡ R squared = .852 (adjusted R squared = .846).

level recorded could be as a result of many responsibilities either internal or external variables that may be calling for attention on the side of male at their working environment or at home.

Invariably, since individuals have the tendency to build up irrational thoughts and erroneous beliefs, they also have the capability to change those thoughts and a belief that is affecting them using such evidence-based treatment package and techniques like REBT.^[62,83] The findings of the current study sharpen the focus of Education Scientists into learning and identifying those variables that constitute their work-related problems like irrational thought and the best approach to alter those beliefs using principles and strategies of REBT.

In the same vein, the current study employed only quantitative measures as a means of data collection. Thus, we suggest that subsequent research should employ qualitative methods of assessment in order to reveal the patterns of stress experienced by individual teachers. Also, the REBA was conducted only among the staff lecturers in the treatment group. This implies that teachers in the control group were denied the chance to partake in the study even when the pretest indicated that they were stressed. The steady increase in dollar rate affected the budget plan, for instance, the purchase of diesel, public addressing system, lodging, accommodation, and feedings of both the therapist and participant as well as transportation among others were all on a higher price. Insecurity challenge is equally another factor that posed a threat from the onset of this research till the end of the program although no casualty was recorded.

4.1. Implications for school management system

The School Management Team involves the leadership of the vice-chancellors, deputy, provost, school principal, vice principal, Dean, headteachers as well as the departmental head. Their responsibility is to improve the quality of work-life cannot be glossed over. It is part of their duties to monitor and supervise the activities of each staff member. Understanding the health and safety should be made a priority. With these responsibilities

and tasks expected of the school management system, the team should make the school environment friendly and safe for school psychologists, psychiatrists, counselors, etc. These are professionals who could apply REBT principles in clinical and nonclinical cases. For instance, school principals should maintain school plants, ensuring that laboratories, halls, electrical and electronic gadgets, medical equipment, etc. are made available for REBT experts to use.

School management organs should embrace the significant role of REBT in work-life Biology lecturers and other science-related lecturers. This population is at risk in the work environment. Some of them work with hazardous substances and apparatus in laboratories. School management systems should understand that the psychological well-being of lecturers is important and should be cared for. Therefore, securing a good psychology-support system to enhance the workability of staff. Therefore, schools should liaise with REBT experts to open REBT institutes in each school in the zone and beyond. Through this, the experts in REBT could organize seminars for all the teaching staff from time to time as this could even benefit those who could be denied the opportunity to participate in future psychological treatment. REBT experts and relevant agencies could collaborate and develop an effective intervention package that could help other populations passing through stress as a result of irrational thoughts see the need to think rationally and lead a healthy life.

4.2. Clinical implications

With the positive benefit of the intervention, clinicians should incorporate REBT principles in their practice. For example, during early detection of high blood pressure, REBT could be delivered as a preventive approach to reduce the number of victims. When it is applied as a preventive approach, it will minimize heart attack or stroke, aneurysm, heart failure, and metabolic syndrome. Considering the increased rate of affected teachers, educators, and scientists, risk development prevention

program should be encouraged by clinical experts. By doing this, the disbelief about self, the world, and the future responsible for or triggering high blood pressure could be reduced. Neglecting the role of frustration, demandingness, awfulizing, etc. in triggering high blood pressure could affect clinical effort by professionals. Therefore, clinical intervention that aims to improve the psychological well-being and medical conditions of patients with high blood pressure should consider the inclusion of REBT principles.

5. Conclusion

The result of this study validated the effectiveness of REBT in treating high levels of stress affecting interest, productivity, and commitment not only in the workplace but home. Stress was identified as the aftermath of irrational thought and erroneous belief. But through the application of REBT principles and strategies, their pessimistic patterns of thought which were anchored on inflexibility, rigidity, and extremism were dealt with. Hence, the participants were able to develop an alternative thought pattern anchored on reality, flexibility, and un-extremist. This indicates that REBT is significant in decreasing individual stressful symptoms. The findings no doubt have added to the knowledge gap that will help other researchers and individuals to grow and improve both mentally and health-wise. Thus, additional research is required to validate the impact of REBT in decreasing depression, anxiety, and mental exhaustion of other university populations in the southeastern region of Nigeria.

Acknowledgments

We sincerely appreciate all our participants who showed high sense of commitment from the beginning of the program till the end. Thank you all.

Author contributions

Conceptualization: Ngozi Anyaegbunam, Queen E. Igabari, Ifeanyichukwu B. Agbigwe, Felicia Ngozi Ezeaku, Sebastine Ebummeh Andor, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro.

Data curation: Ngozi Anyaegbunam, Queen E. Igabari, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro.

Formal analysis: Ngozi Anyaegbunam, Queen E. Igabari, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro.

Funding acquisition: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Joy Obiageli Oneli, Ogochukwu Vivian Nwabunani.

Investigation: Ngozi Anyaegbunam, Queen E. Igabari, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Ogochukwu Vivian Nwabunani.

Methodology: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor,

Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Ogochukwu Vivian Nwabunani.

Project administration: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Ogochukwu Vivian Nwabunani.

Resources: Ngozi Anyaegbunam, Queen E. Igabari, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Joy Obiageli Oneli.

Software: Ngozi Anyaegbunam, Queen E. Igabari, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Joy Obiageli Oneli.

Supervision: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Joy Obiageli Oneli, Ogochukwu Vivian Nwabunani.

Validation: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Desmon Ngwainmbi, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Joy Obiageli Oneli, Ogochukwu Vivian Nwabunani.

Visualization: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Joy Obiageli Oneli.

Writing – original draft: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Sebastine Ebummeh Andor, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Ogochukwu Vivian Nwabunani.

Writing – review & editing: Ngozi Anyaegbunam, Queen E. Igabari, Elizabeth Osita Egbule, Ifeanyichukwu B. Agbigwe, Kelechi R. Ede, Uzoamaka Patricia Agu, Felicia Ngozi Ezeaku, Ifesinachi Jude Ezugwu, Sebastine Ebummeh Andor, Jazuli Tijjani, Beth Nnenna Oluka, Innocent Ebere Okereke, Ifeanyichukwu D. Okoro, Joy Obiageli Oneli, Ogochukwu Vivian Nwabunani.

References

- [1] Areekkuzhiyil S. Factors influencing the organizational stress among teachers working in higher education sector in Kerala: an empirical analysis. *Journal Research and Pedagogic Interventions*. 2014;2:1–15.
- [2] Dewe P, Cooper CL. *Stress: A Brief History*. Oxford: Blackwell; 2015.
- [3] Ene CU, Ugwuanyi CS, Ejimonye JC, et al. Effects of rational emotive occupational health coaching on work stress among academic staff of science and social science education in Nigerian universities: a randomised trial evaluation. *Medicine (Baltimore)*. 2021;100:e26963.
- [4] Guglielmi R, Tatrow K. Occupational stress, burnout, and health in teachers: a methodological and theoretical analysis. *Rev Educ Res*. 1998;68:61–99.
- [5] Kaur N. Evaluation of factors causing stress among school teachers of North India. dissertation submitted to Dublin business school in partial fulfillment of the requirements for the award of degree of Master of Business Administration from QQI. 2016.

- [6] Pettigrew LS, Wolf GE. Validating measures of teacher stress. *Am Educ Res J.* 1982;19:373–96.
- [7] Agai-Demjaha T, Minov J, Stoleski S, Zafirova B. Stress causing factors among teachers in elementary schools and their relationship with demographic and job characteristics. *OA Maced J Med Sci.* 2015;3:493–9.
- [8] Dorenkamp I, Weiß E. What makes them leave? A path model of post-docs' intentions to leave academia. *High Educ.* 2018;75:747–67.
- [9] Mudrak J, Zabrodská K, Kveton P, et al. Occupational well-being among university faculty: a job demand-resources model. *Res High Educ.* 2018;59:325–48.
- [10] Kaiser JS, Polczynski JJ. Educational stress: sources reactions, preventions. *Peabody J Educ.* 1982;59:127–36.
- [11] Ogakwu NV, Ede MO, Agu PU, et al. School-based intervention for academic stress management and school adjustment among industrial technical education students: implications for educational administrators. *Medicine.* 2023;102:e32547.
- [12] Baker KAB, Shammari A, Jefri OA. Occupational stress in different organizations a Saudi Arabian. *J Manag Psychol.* 1995;10:24–8.
- [13] Ngari SM, Ndungu A, Mwonya R, et al. Levels of stress among secondary school administrators and its implication in education management in Kenya. *Acad J.* 2013;8:676–81.
- [14] Alemu Y, Teshome A, Kebede M, Regassa T. Experience of stress among student-teachers enrolled in postgraduate diploma in teaching: the case of Haramaya University cluster centers, Ethiopia. *Afr Educ Res J.* 2014;2:96–10.
- [15] Venables KM, Allender S. Occupational health needs of universities: a review with an emphasis on the United Kingdom. *Occup Environ Med.* 2006;63:159–67.
- [16] Catano V, Francis L, Haines T, et al. Occupational stress in Canadian universities: a national survey. *Int J Stress Manag.* 2010;17:232–58.
- [17] Darabi M, Macaskill A, Reidy L. A qualitative study of the UK academic role: positive features, negative aspects and associated stressors in a mainly teaching-focused university. *J Further Higher Educ.* 2017;41:566–80.
- [18] Johnson SJ, Willis SM, Evans J. An examination of stressors, strain and resilience in academic and non-academic UK university job roles. *Int J Stress Manag.* 2019;26:162–72.
- [19] Balakrishnan P, Bahari S, Paul J. Impact of predisposing factors on academic stress among pre-service teachers. *Int J Med Health Res.* 2017;6:173–8.
- [20] Agbo I. Assessment of Stress of Teachers of Primary School Pupils in Enugu State. (Master's Thesis). Awka: Nnamdi Azikiwe University; 2012.
- [21] Nwimo IO, Onwunaka C. Stress among secondary school teachers in Ebonyi State, Nigeria: suggested interventions in the worksite Milieu. *J Educ Pract.* 2015;6:93–100.
- [22] World Health Organization achieving universal health coverage for the world's 1.2; 2019.
- [23] United Nations Educational Scientific and Cultural Organization. Gender mainstreaming implementation framework. 2013. Available at: <http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/BSP/GENDER/PDF/>. Accessed September 23, 2022.
- [24] Okeke FN. Women and leadership in higher education: facing international challenges and maximizing opportunities. *Assoc Commonwealth Univ Bull.* 2006;147:14–7.
- [25] Agbigwe IB. Effect of Cognitive Behavioural Intervention in Managing Stress Among Teachers in Inclusive Secondary Schools in Enugu State (M.Ed Thesis). Nsukka; University of Nigeria; 2023.
- [26] Miller D. Adolescents' decision making in social situations: a self-regulation perspective. *Appl Dev Psychol.* 2012;22:237–56.
- [27] Lonkilla M. The importance of work-related social ties in post-soviet Russia: the role of co-workers in the personal networks in St. Petersburg and Helsinki. *J Med.* 2009;30:46–50.
- [28] Vita-Agundu UC, Eseadi C, Obasuyi HU, Sewagegn AA, Amedu AN. Assessment of stress management coaching among Nigerian pre-service history teachers: a randomized controlled study. *Medicine (Baltimore).* 2022;101:e30999.
- [29] Ekwueme HU, Ede MO, Eze EC, et al. Impact of occupational health coaching on irrational career beliefs and workplace deviant behaviors among school employees: Implications for Educational administrative policy. *Medicine (Baltimore).* 2023;102:e33685.
- [30] David D, Cotet C, Matu S, Mogoase C, Stefan S. 50 years of rational-emotive and cognitive-behavioral therapy: a systematic review and meta-analysis. *J Clin Psychol.* 2018;74:304–18.
- [31] Onuigbo LN, Eseadi C, Ugwoke SC, et al. Effect of rational emotive behavior therapy on stress management and irrational beliefs of special education teachers in Nigerian elementary schools. *Medicine (Baltimore).* 2018;97:e12191.
- [32] Eze A, Anyebe MO, Nnamani RG, et al. Online cognitive-behavioral intervention for stress among English as a second language teachers: implications for school health policy. *Front Psychiatry.* 2023;14:1140300.
- [33] Ellis A. *Overcoming Resistance: A Rational Emotive Behavior Therapy Integrative Approach.* 2nd ed. New York, NY: Springer Publishing Company; 2002.
- [34] Ugwuanyi CS, Okeke CIO, Agboeze MU, et al. Impacts of cognitive behavior therapy on occupational stress among science and social science education facilitators in open and distance learning centers and its implications for community development: a randomized trial group. *Medicine (Baltimore).* 2020;99:e22677.
- [35] Igbokwe UL, Onyechi KCN, Ogbonna CS, et al. Rational emotive intervention for stress management among English education undergraduates. *Medicine (Baltimore).* 2019;98:e17452.
- [36] Tanhan F. An analysis of factors affecting teachers' Irrational beliefs. *Educ Sci.* 2014;14:465–70.
- [37] DiGiuseppe RA, Doyle KA, Dryden W, Backx WA. *Practitioner's Guide to Rational-Emotive Behavior Therapy*, 3rd ed. New York, NY: Oxford University Press; 2013.
- [38] Dryden W, Branch R. *The Fundamentals of Rational Emotive Behaviour Therapy: A Training Handbook.* 2nd ed. Chichester: Wiley; 2008.
- [39] Iremeka FU, Ede MO, Amaeze FE, et al. Improving work-life balance among administrative officers in Catholic primary schools: assessing the effect of a Christian religious rational emotive behavior therapy. *Medicine (Baltimore).* 2021;100:e26361.
- [40] Areji AC, Ede MO, Agbo CO, et al. Testing the impact of occupational intervention on professional ethics and values of Staff in University Medical Centers. *Medicine (Baltimore).* 2023;102:e34171.
- [41] Ifelunni CO, Ede MO, Okeke CI. Rational emotive intervention for work-family conflict and female primary school teachers' well-being. *Curr Psychol.* 2023;42:26173–86.
- [42] Izdebski Z, Kozakiewicz A, Białorudzki M, Dec-Pietrowska J, Mazur J. Occupational burnout in healthcare workers, stress and other symptoms of work overload during the COVID-19 pandemic in Poland. *Int J Environ Res Public Health.* 2023;20:2428.
- [43] Ede MO, Mawila D, Onuigbo LN, Victor-Aigbodion V. Treating the psychological distress in children with adventitious blindness. *J Ration Emot Cogn Behav Ther.* 2025;43:1–20.
- [44] Kyriacou C, Sutcliffe JA model of teacher stress. *Educ Stud.* 1978;4:1–6.
- [45] Macavei B. The role of irrational beliefs in the rational emotive behavior theory of depression. *J Cogn Behav Psychother.* 2005;5:73–81.
- [46] McDermut JF, Haaga DAF, Bilek LA. Cognitive bias and irrational beliefs in major depression and dysphoria. *Cogn Ther Res.* 1997;21:459–76.
- [47] Nelson RE. Irrational beliefs in depression. *J Consult Clin Psychol.* 1977;45:1190–1.
- [48] Smith TW. Assessment in rational-emotive therapy: empirical access to the ABCD model. In: Bernard ME, DiGiuseppe R, eds. *Inside Rational-Emotive Therapy: A Critical Appraisal of the Theory and Therapy of Albert Ellis.* San Diego, CA: Academic Press; 1989;135–153.
- [49] Solomon A, Bruce A, Gotlib IH, Wind B. Individualized measurement of irrational beliefs in remitted depressives. *J Clin Psychol.* 2003;59:439–55.
- [50] Ellis A, Dryden W. *The practice of rational-emotive therapy (RET).* New York: Springer; 1987.
- [51] Centre for rational-emotive behaviour therapy at the University of Birmingham. What are irrational beliefs? Available at: <https://www.birmingham.ac.uk/schools/psychology/centre/rebt/about/beliefs.aspx>. Accessed April 14, 2018.
- [52] Ellis A. Rational psychotherapy and individual psychology. *J Individ Psychol.* 1957;13:38–44.
- [53] Mneimne, M. Demandingness or "The rules of life: perceived abilities and \$0.0". 2014. Available at: <http://albertelli.org/demandingness-or-the-rules-of-life-perceived-abilities-and-2-cents/>. Accessed April 11, 2018.
- [54] Szentagotai A, David D, Lupu V, Cosman D. Rational emotive behavior therapy versus cognitive therapy versus pharmacotherapy in the treatment of major depressive disorder: mechanisms of change analysis. *Psychotherapy (Chic).* 2008;45:323–38.
- [55] Ugwuanyi LT, Ede MO, Agbigwe IB, et al. Effect of rational emotive behaviour therapy on depressive symptoms in a sample of parents of children with intellectual disability. *J Ration Emot Cogn Behav Ther.* 2022;41:128–43.

- [56] Ugwoke SC, Eseadi C, Igboke CC, et al. Effects of a rational-emotive health education intervention on stress management and irrational beliefs among technical college teachers in Southeast Nigeria. 2017;96:e7658
- [57] Davarmanesh A, Barrati F. An Introduction to the Principles of Rehabilitation of People with Disabilities. Tehran: Roshd; 2006.
- [58] Ellis A. Reason and Emotion in Psychotherapy. Lyle Stuart, New York; 1962.
- [59] Ogba FN, Onyishi CN, Ede MO, et al. Effectiveness of SPACE model of cognitive behaviour coaching in management of occupational stress in a sample of school administrators in South-East Nigeria. J Behav Emot Cogn Behav Ther. 2019;38:345–68.
- [60] Mahfar M, Amat-Senin A. Managing stress at workplace using the rational-emotive behavioural therapy (REBT). International Conference on Human Resource Development, 5–7th April, 2015, Johor, Bahru; 2015.
- [61] Obiweluozo PE, Ede MO, Onwurah CN, Uzodinma UE, Dike IC, Ejiofor JN. Impact of cognitive behavioural play therapy on social anxiety among school children with stuttering deficit: a cluster randomised trial with three months follow-up. Medicine (Baltimore). 2021;100:e24350.
- [62] DiGiuseppe R, Doyle KA, Rose RD. Rational emotive behaviour therapy for depression: achieving unconditional self-acceptance. In: Reinecke MA, Davison MR, eds. Comparative Treatments of Depression. New York: Springer; 2001:220–228.
- [63] Ede MO, Okeke CI, Obiweluozo PE. Intervention for treating depression in parents of children with intellectual disability of down's syndrome: a sample of Nigerian parents. 2002;41:511–35.
- [64] Beric M. Rational emotive behavior therapy (REBT) for substance abuse near me. Available at: <https://americanaddictioncenters.org/therapy-treatment/rational-emotive-behavior-therapy>. Accessed December 6, 2024.
- [65] Lee J-H, Schell MJ, Roetzheim R. Analysis of group randomized trials with multiple binary endpoints and small number of groups. PLoS One. 2009;4:e7265.
- [66] American Psychological Association (APA). Ethical principles of psychologists and code of conduct. Washington DC: American Psychological Association; 2017.
- [67] Faul F, Erdfelder E, Lang AG, et al. G* Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007;39:175–91.
- [68] Muñoz RF, Aguilar-Gaxiola S, Guzmán J, et al. Treatment manual for cognitive behavioral therapy for depression. Ind Format. 2007;5:13. (Therapist's Manual).
- [69] Bernard ME. Teacher irrationality and teacher stress. In: Proceedings of the 24th International Congress of Psychology. Sydney, Australia. 28 August–2 September 1988.
- [70] Bora E, Gökçen S, Kayahan B, Veznedaroglu B. Deficits of social-cognitive and social-perceptual aspects of theory of mind in remitted patients with schizophrenia: effect of residual symptoms. J Nerv Ment Dis. 2008;196:95–9.
- [71] Bermejo-Toro L, Prieto-Ursua M. Teachers irrational beliefs and their relationship to distress in the profession. Psychol Spain. 2006;10:88–96.
- [72] Cohen S, Kamarck T, Mermelstein RA. global measure of perceived stress. J Health Soc Behav. 1983;24:385–96.
- [73] Anwer S, Manzar MD, Alghadir AH, Salahuddin M, Abdul Hameed U. Psychometric analysis of the perceived stress scale among healthy university students. Neuropsychiatr Dis Treat. 2020;16:2389–96.
- [74] Saghaei M. Random allocation software. 2004. Available at: <http://mahmoodsaghaei.tripod.com/Softwares/ranalloc.html>. Accessed December 18, 2016.
- [75] Ogbuanya TC, Eseadi C, Orji CT, et al. The effect of rational emotive behavior therapy on irrational career beliefs of students of electrical electronics and other engineering trades in clinical colleges in Nigeria. J Ration Emot Cogn Behav Ther. 2018;36:201–19.
- [76] Jesus SN, Conboy JA. Stress management course to prevent teacher distress. IJEM. 2001;15:131–7.
- [77] Ellis A, Bernard ME. Rational Emotive Behavioral Approaches to Childhood Disorders: Theory, Practice and Research. Springer, New York; 2006.
- [78] Vernon A. Rational emotive education. Romanian J Cogn Behav Psychother. 2004;4:23–37.
- [79] David AR, Szamoskozi S. A meta-analytical study on the effects of cognitive behavioral techniques for reducing distress in organizations. J Cogn Behav Psychother. 2011;11:221–36.
- [80] Wang J, Korczykowski M, Rao H, et al. Gender difference in neural response to psychological stress. Soc Cogn Affect Neurosci. 2007;2:227–39.
- [81] Zamirullah K, Abul BL, Naseem A. The level of stress in male and female. 2015.
- [82] Madu VN. Effect of cognitive restructuring and assertive therapies on the reduction of depressive tendencies among colleges of education students. Int J Psychol Behav Sci. 2020;10:1–8.
- [83] Dryden W, Ellis A. Rational emotive behavior therapy. In: Handbook of Cognitive-Behavioral Therapies. 2nd ed. New York: The Guilford Press; 2001.